

a message sequence chart (hereinafter, referred to as "the MSC").

FIG. 4 is the MSC depicting procedure of the MIL control operation.

First, the PF 500 outputs the MIL state renewal request to the MIL controlling object 400. Upon receiving the MIL state renewal request from the PF 500, the MIL controlling object 400 carries out an MIL response process S1. In the MIL response process S1, the MIL information request is outputted to the malfunction-information managing object 200.

Upon receiving the MIL information request, the malfunction-information managing object 200 carries out an MIL information output process S2. In the MIL information output process S2, a control instruction retrieving request is outputted to each malfunction-information storing object 300.

Upon receiving the control instruction retrieving request, each malfunction-information storing object 300 carries out a control instruction output process S3. In the control instruction output process S3, the corresponding control instruction is specified and is outputted based on the stored malfunction information. Thus, each malfunction-information storing object 300 includes relationship information indicative of the relationship between the malfunction information and the corresponding control instruction. The control instructions mentioned above include three control instructions, namely, "flashing" (or simply referred to as "FLASH."), "lighting-on" (or simply referred to as "ON") and "lighting-off" (or simply referred to as "OFF") of the MIL 25.

In the MIL information output process S2 of the malfunction-information managing object 200, when the control instruction is outputted from all the malfunction-information storing objects 300, the MIL information is prepared and is outputted based on the control instructions outputted from all the malfunction-information storing objects 300.

When the MIL information is outputted from the malfunction-information managing object 200, the MIL controlling object 400 sends the MIL response to the PF 500 based on the vehicle information. In this way, the state of the MIL 25 is actually renewed.

Next, with reference to FIG. 5, a relationship between the malfunction information and the control instruction stored by the corresponding malfunction-information storing object 300 will be described.

Each malfunction-information storing object 300 is provided for each malfunction check item, as mentioned above. In the present embodiment, a malfunction-information name used for storing the malfunction information is provided for each malfunction check item in a one-to-one relationship. That is, the unique malfunction-information name is provided to each malfunction-information storing object 300. For example, with reference to FIG. 5, a malfunction-information storing object 310 has the malfunction-information name of "AIR FLOW SHEET", and a malfunction-information storing object 320 has the malfunction-information name of "WATER TEMPERATURE SHEET" (or simply referred to as "WATER TEMP.SHEET"). Similarly, a

malfunction-information storing object 330 has the malfunction-information name of "INTAKE AIR TEMPERATURE SHEET" (or simply referred to as "AIR TEMP.SHEET"), and a malfunction-information storing object 340 has the malfunction-information name of "THROTTLE HIGH ABNORMAL SHEET" (or simply referred to as "THROTTLE HIGH ABNORM.SHEET"). Furthermore, a malfunction-information storing object 350 has the malfunction-information name of "THROTTLE LOW ABNORMAL SHEET" (or simply referred to as "THROTTLE LOW ABNORM. SHEET"). These five malfunction-information storing objects 310-350 are simply referred to as the first to fifth malfunction-information storing objects 310-350, respectively, for the sake of clarity.

As shown in FIG. 5, each one of the first to fifth malfunction-information storing objects 310-350 stores the corresponding malfunction information as well as the corresponding relationship information (or simply referred to as "REL.") indicative of the relationship between the malfunction information and the control instruction. The malfunction information is stored by the malfunction-information managing object 200 and indicates a current malfunction level. For example, the malfunction information of the first malfunction-information storing object 310 is stored as "temporarily abnormal" (or simply referred to as "TEMP.ABNORM."), and the malfunction information of the second malfunction-information storing object 320 is stored as "normal" (or simply referred to as "NORM."). Similarly, the malfunction information of the third malfunction-information